

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554

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In the Matter of)
)
VIRTUAL GEOSATELLITE, LLC)
)
Petition for Rulemaking to make)
Available C-Band Spectrum for)
Non-Geostationary Fixed-Satellite)
Service Gateway Operations in the)
U.S.)

RM No. 9650

FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF THE SECRETARY

COMMENTS OF COMSAT CORPORATION

COMSAT Corporation ("COMSAT") hereby submits its
Comments in response to the Petition for Rulemaking
("Petition") filed by Virtual Geosatellite, LLC ("Virtual
Geo") in the above-captioned proceeding.

Introduction

In its Petition, Virtual Geo asks the Commission to
initiate a rulemaking proceeding to make spectrum in the
bands 5925-6725 MHz (Earth-to-space) and 3700-4200 MHz
(space-to-Earth) available for use by gateway links for
non-geostationary ("NGSO") Fixed-Satellite systems ("FSS").¹
As set forth in detail below, COMSAT believes that a
rulemaking procedure is premature. Detailed study is first
needed to establish criteria to protect FSS GSO systems

¹ Petition at 1.

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from harmful interference from NGSO satellite systems before opening those bands up to routine NGSO use. Although the requested rulemaking process could be a vehicle for initiating needed studies, there is also a need to obtain international participation in such studies and international agreement regarding the detailed criteria for sharing between FSS GSO and FSS NGSO systems on a routine basis. COMSAT believes that the better way to proceed is first to initiate such studies in the appropriate study group(s) of the ITU-R and to participate actively in advancing the studies.

Studies for the higher frequency bands listed in Article S22 of the Radio Regulations have been in progress for several years in preparation for WRC-2000. These studies have proven to be technically challenging and controversial due to the potentially negative impact of the proposed NGSO sharing upon the capacity and availability of GSO FSS systems and terrestrial Fixed Service (FS) systems. Given the importance of the C-Band allocations to both the GSO FSS system operators and the terrestrial FS system operators, there is good reason to expect that such studies of C-Band sharing would also require substantial effort to attempt to find satisfactory solutions. If the Commission

were to initiate a rulemaking prior to any ITU-R studies, the rulemaking process would need to develop a much more substantial starting basis than provided by Virtual Geo.

ITU Radio Regulations

The ITU Radio Regulations provide for NGSO operations in the C-Band allocation only under the very restrictive condition that: "Non-geostationary systems shall not cause unacceptable interference to geostationary-satellite systems in the fixed-satellite service and the broadcasting-satellite service operating in accordance with these regulations."²

WRC-97 adopted provisional power limits for "acceptable interference" for certain higher frequency bands. It is expected that WRC-2000 will either confirm or revise the limits currently included in Articles S21 and S22 of the Radio Regulations. However, WRC-97 did not propose explicit "acceptable interference" criteria for the C-band allocations. Those criteria for C-band sharing were left to "administrations concerned" to fix by agreement, "using the relevant ITU Recommendations as a guide."³

² See World Radio Communication Conference-97, Final Acts, Radio Regulation S22.

³ *Id.* at A.S22.1.

Any proposed general use of NGSO satellite systems in the C-band would effect a large number of administrations. Therefore, a need exists to have wide agreement on any criteria that are developed. That need has already been recognized for certain Ka and Ku-band allocations and has resulted in the ongoing intense ITU-R study activities leading to WRC-2000.

Control of Interference Between NGSO and GSO FS Systems

Development of measures to limit interference between FSS NGSO and FSS GSO systems is a complex undertaking that presents numerous technical problems requiring compromises by all of the parties that would be impacted by the entire range of possible NGSO systems that might be planned in the C-band.

The Petition suggests that adequate control of interference between the NGSO and GSO systems is relatively simple if the NGSO system operates in a manner similar to the proposed VIRGOTM system. Virtual Geo maintains that the "VIRGOTM satellites are separated from the geostationary arc by at least 40 degrees at all times within the system's service arcs." This statement suggests to the casual

reader that the earth station beams for GSO systems will enjoy very large discrimination angles in the directions of the VIRGO satellites at all times, thereby limiting the interference level.

This is not true, however, as analysis shows. In the case of the VIRGOTM system, for example, a station in the center of the U.S. at 40° N.L. and 100° W.L. will see an active VIRGOTM satellite in a direction that is less than 10 degrees from the geostationary arc. The pointing angles of all potential earth stations in both the NGSO and GSO systems under consideration for the shared frequency bands need to be considered to assess potential pointing conjunction or near-conjunction interference cases.

While the analysis of sharing with an NGSO system like the VIRGOTM system with its highly inclined and eccentric orbits and repeating ground-tracks may be relatively straight-forward, sharing analysis for systems with other types of NGSO orbits can be more difficult. For example, earth station pointing conjunction cases can occur which can cause link outages in the victim link, if co-frequency links of the two systems are simultaneously operating at the time of the conjunction or near-conjunction.

Nevertheless, there are measures which can be identified to preclude unacceptable interference. For example, if the NGSO system has only a few earth stations, unacceptable uplink interference from the NGSO earth station might be precluded by having the station cease transmitting before the discrimination angle to the GSO arc becomes too small. However, timing coordination of emissions from a large number of NGSO earth station transmitters to satisfy the discrimination angle criterion would be considerably more challenging.

Development of Criteria


Sometimes the impact of occasional interference is to cause a margin against link failure to be exceeded and an outage to occur. As discovered in the recent ITU studies of NGSO/GSO system sharing, this problem can be especially troublesome to systems that otherwise require relatively small link noise margins against precipitation fading. The development of agreed criteria to protect a GSO link against NGSO interference is likely to be difficult, since GSO system reliability and capacity compromises would likely be at issue.

Conclusion

As set forth above, Virtual Geo has not provided an adequate basis for the proposed rulemaking, as "all facts, views, arguments, and data" necessary to support the launching of the requested rulemaking have not been provided.⁴ Virtual Geo provides very little technical information to demonstrate that the outcome of such a rulemaking is likely to be favorable to the premise that sharing should be allowed. The few arguments that are presented are very restricted in nature and applicable to only a particular subset of possible NGSO systems. The amount of technical substance for even that subset, the VIRGOTM - like systems, is nearly non-existent and overly simplified at best. Accordingly, the Petition should be denied.

⁴ See 47 C.F.R. Section 1.4019 (c).

Respectfully submitted,
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July 12, 1999